Notice of Allowability	Application No.	Applicant(s)	
	10/817,410	FUTAMURA ET AL.	
	Examiner	Art Unit	
	Lana N. Le	2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 3/30/04

2. ☒ The allowed claim(s) is/are 1-17.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date 7/10/06

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

2. Authorization for this examiner's amendment was given in a telephone interview with applicant's representative, Samson Helfgott, on 7/10/06.

3. The application has been amended as follows:

- cancel claims 18-19.

4. The following changes to the drawings have been approved by the examiner and agreed upon by applicant:

- in figure 2, numeral block "6", delete "processer" and add "processor".

In order to avoid abandonment of the application, applicant must make these above agreed upon drawing changes.

REASON FOR ALLOWANCE

5. The following is an examiner's statement of reasons for allowance:

Regarding independent claim 1, Dent (US 5,610,559) discloses a radio equipment enabling radio communication by performing frequency conversion (via

mixers 65, 66, 85, 80) corresponding to signals of different frequency bands (figs. 3-4), and including a synthesizer comprising:

a first signal generator (100) generating a first signal having a first frequency (fig. 4); a second signal generator (103) having a second frequency divider (107) to which a feedback signal is input, a second phase comparator (105) comparing a phase of output signal of the second frequency divider (107) with a phase of a second reference input signal (from 108) having a predetermined frequency, a second filter (111) filtering output signal of the second phase comparator (105), and a second voltage controlled oscillator (103) which generates a second signal having a second frequency lower than the first frequency based on output signal of the second filter (111), and feedbacks the second signal to the second frequency divider (105) as the feedback signal (col 7, line 46 – col 8, line 63). However, Dent and the cited prior art fail to disclose:

a frequency synthesizer synthesizing the first signal with the second signal, generating a local oscillator signal either having a frequency derived from adding the second frequency to the first frequency, or having a frequency derived from subtracting the second frequency from the first frequency, wherein the radio equipment uses the local oscillator signal generated by the frequency synthesizer for frequency conversion in the radio communication.

Regarding claim 15, Dent (US 5,610,559) discloses a radio equipment enabling radio communication by performing frequency conversion (via mixers 65, 66, 85, 80) corresponding to signals of different frequency bands (figs. 3-4), and including a synthesizer (fig. 4) comprising:

a first signal generator (100) having a first frequency divider to which a feedback signal is input, a first phase comparator (104) comparing a phase of output signal of the first frequency divider (106) with a phase of a first reference input signal having a predetermined frequency a first filter (110) filtering output signal of the first phase comparator (104), and a first voltage controlled oscillator (100) which generates a first signal having a first frequency based on output signal of the first filter, and feedbacks the first signal to the first frequency divider as the feedback signal (col 7, lines 46 – col 8, line 63);

a second signal generator (103) having a second frequency divider (107) to which a feedback signal is input, a second phase comparator (105) comparing a phase of output signal phase of the second frequency divider (107) with a phase of a second reference input signal having a predetermined frequency, a second filter (111) filtering output signal of the second phase comparator, and a second voltage controlled oscillator (103) which generates a second signal having a second frequency different from the first frequency based on output signal of the second filter (111), and feedbacks the second signal to the second frequency divider (107) as the feedback signal (col 7, line 46 – col 8, line 63).

However, Dent and the cited prior art fail to disclose the frequency synthesizer synthesizing the first signal with the second signal, and generating a local oscillator signal either having a frequency derived from adding the first frequency to the second frequency, or having a frequency derived from subtracting the smaller frequency between the first frequency and the second frequency, from the larger frequency there

between, wherein the radio equipment uses the local oscillator signal generated by the frequency synthesizer for frequency conversion in the radio communication.

Regarding claim 16, Dent (US 5,610,559) disclose a local oscillator signal generation method for generating a local oscillator signal for use in frequency conversion in radio equipment enabling radio communication by performing frequency conversion (via mixers 65, 66, 85, 80) corresponding to signals on different frequency bands (figs. 3-4), comprising:

generating a first signal having a first frequency (fig. 4); a second signal generating a second signal (via 103) having a second frequency lower than a first frequency, by use of a phase lock loop (103, 109, 102, 105, 111, 107, 108) which includes a VCO (103), a frequency divider (107) to which a feedback signal is input from the VCO (103), a phase comparator (105) comparing a phase of output signal of the frequency divider (107) with a phase of a reference input signal (from 108) having a predetermined frequency, a filter (111) filtering output signal of the phase comparator (105), and feeding the output signal to the voltage controlled oscillator (103) (col 7, line 46 – col 8, line 63).

However, Dent and the cited prior art fail to disclose synthesizing the first signal with the second signal, and generating the local oscillator signal either having a frequency derived from adding the second frequency to the first frequency, or having a frequency derived from subtracting the second frequency from the first frequency.

Regarding claim 17, Dent (US 5,610,559) discloses a local oscillator signal generation method for generating a local oscillator signal for use in frequency

conversion (via mixers 65, 66, 85, 80) in radio equipment enabling radio communication by performing frequency conversion corresponding to signals of different frequency bands (figs. 3-4), comprising:

generating a first signal having a first frequency by use of a phase lock loop (100, 101, 104, 110, 106, 108) which includes a first voltage controlled oscillator (100), a first frequency divider (107) to which a feedback signal is input from the first voltage controlled oscillator (100), a first phase comparator (104) comparing a phase of output signal of the first frequency divider (106) with the phase of a first reference input signal having a predetermined frequency, and a filter (110) filtering output signal of the first phase comparator (104) and feeding the output signal to the first voltage controlled oscillator (100) (col 7, line 46 – col 8, line 63);

a second signal generating a second signal (via 103) having a second frequency lower than a first frequency, by use of a phase lock loop (103, 109, 102, 105, 111, 107, 108) which includes a second VCO (103), a second frequency divider (107) to which a feedback signal is input from the VCO (103), a second phase comparator (105) comparing a phase of output signal of the second frequency divider (107) with a phase of a second reference input signal (from 108) having a predetermined frequency, a filter (111) filtering output signal of the second phase comparator (105), and feeding the output signal to the second voltage controlled oscillator (103) (col 7, line 46 – col 8, line 63).

However, Dent and the cited prior art fail to disclose:

synthesizing the first signal with the second signal, and generating the local oscillator signal either having a frequency derived from adding the second frequency to the first frequency, or having a frequency derived from subtracting the smaller frequency between the first frequency and the second frequency, from the larger frequency therebetween.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lana N. Le whose telephone number is (571) 272-7891. The examiner can normally be reached on M-F 9:30-18:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward F. Urban can be reached on (571) 272-7899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Lana Le

7-10-06

LANA LE
PRIMARY EXAMINER